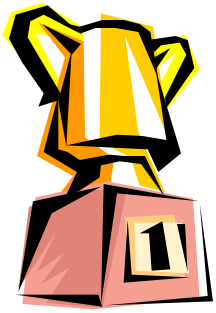
ENERGY NEWS

A quarterly publication of the Energy and Utilities Department

Inside ...



Winners Announced! Congratulations!

Navy News Service Proclaims FY97 FEMP Energy Award Winners in August 1998 Message

"Ten Department of the Navy commands are winners of Federal Energy and Water Management (FEMP) Awards. The commands, representing Navy and Marine Corps shore facilities and the fleet, are recognized by the Department of Energy for their outstanding energy and water management and conservation achievements in FY97. The winners were announced August 21, 1998, by the Federal Interagency Energy Policy Committee. FEMP awards will be presented during a ceremony in Washington, DC, on October 28, 1998.

USS Mobile Bay (CG 53) Yokosuka, Japan, achieved fuel savings of $2,722,416 over a three-year period. Mobile Bay's underway energy planning is reducing fuel consumption by 30,000 barrels annually, equating to $1,440,000 in fuel savings.

Training Squadron (VT) FOUR, NAS Pensacola, Florida, saved $975,000 in FY97 through the use of more efficient aircraft, innovative scheduling, and increased energy awareness in buildings.

Over the past decade, the Navy and Marine Corps have reduced shore facility energy more than 20% per square foot - avoiding approximately $300 million in energy costs.

Winners in the Organization Category for Mobility Energy:

USS Chosin (CG 65) Pearl Harbor, Hawaii, reduced fuel consumption in FY97 by 18,000 barrels compared to the ship's three-year average rates, saving approximately $990,000 in energy costs.

Marine Corps Recruit Depot, Parris Island, South Carolina, reduced energy consumption by 19.7 percent compared to baseline year 1985. Major lighting and heat pump retrofit projects were undertaken in FY97.

(Continued on page 8)

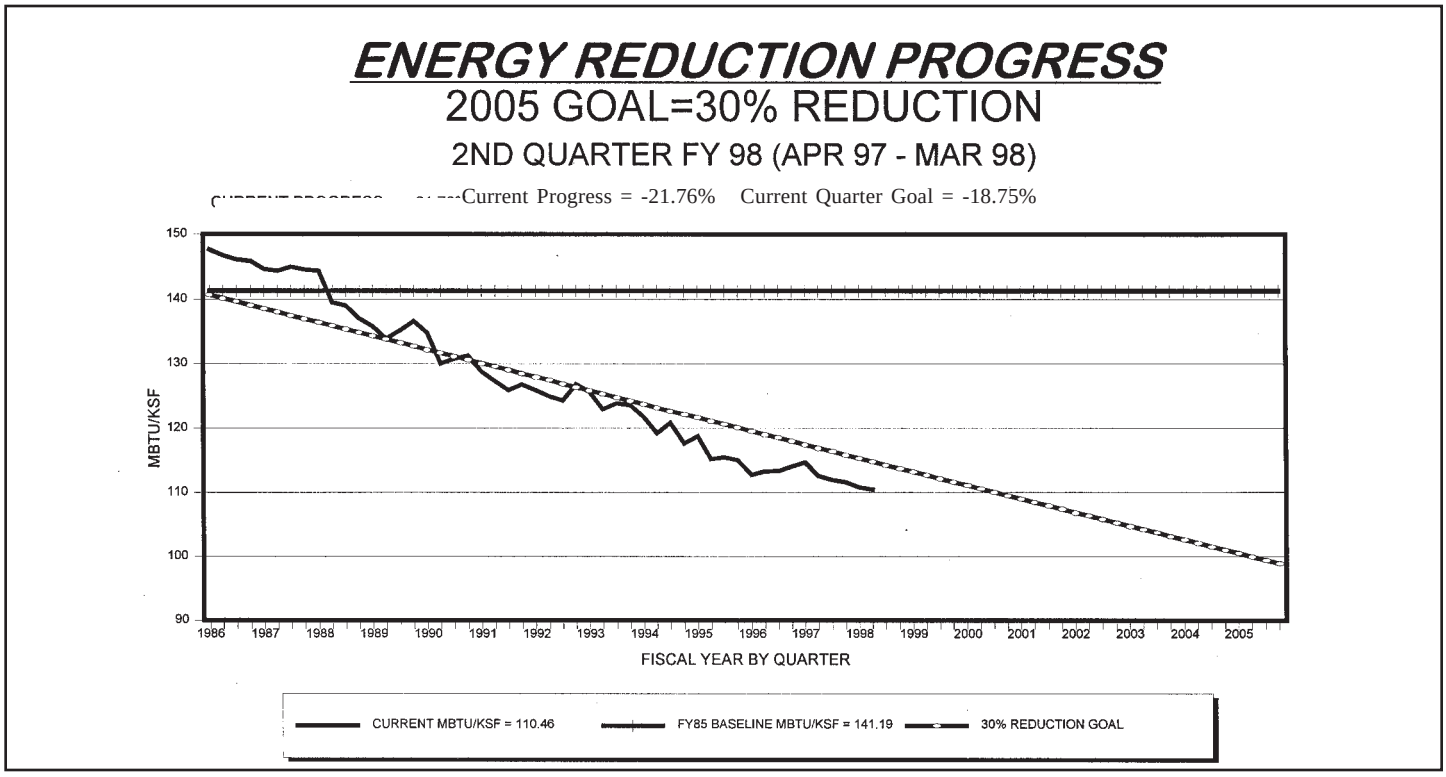
Naval Activity Energy Consumption for Apr 97 - Mar 98 (2nd Qtr FY98)*

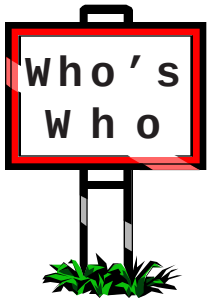
Includes Housing and Shore for Navy and Marine Corps Activities; excludes Government Owned/Contractor Operated (GOCO), Cold Iron, Transmitter, Simulator and Miscellaneous Support

Energy Type	MBtu Consumed		Change From FY85 (%)	By Energy Type (%)
	Apr 97 - Mar 98	FY85**		
Electricity	29,027,883	29,076,897	-0.17	43.05
Fuel Oils	11,308,755	26,993,823	-58.11	16.77
Natural Gas	22,682,653	25,531,380	-11.16	33.64
Propane Gas	251,741	314,986	-20.08	0.37
Coal	2,084,016	4,106,710	-49.25	3.09
Steam & Hot Water	999,337	1,288,378	-22.43	1.48
Residual	882,251	1,240,804	-28.90	1.31
Distillate	136,338	63,408	115.02	0.20
Reclaimed Oil	49,954	244,430	-79.56	0.07
Total (12 Months)	67,422,928	88,860,816	-24.13%	100.00%
Navy and Marine Corps (ksf)	610,373	629,381	-0.00%	
Navy and Marine Corps (MBtu/ksf)	110.46	141.19	-21.50%	
Navy Shore and Housing (MBtu/ksf)	117.38	149.71	-22.38%	

* The interim energy reduction goal for the end of March 98 is -18.75% below FY85 consumption. The percentage is derived by straight line interpolation of the 30% decrease per gross square foot from FY85 to FY2005.

** These FY85 figures incorporate all corrections approved to date.





Get to know Karlin Canfield

Energy and Utilities Controls Specialist

Well known for his expertise in the controls field, Karlin has played key roles in the development, testing, and implementation of a wide variety of energy and utility control systems. One of his current efforts is technical oversight of the procurement to install a Supervisory Control and Data Acquisition (SCADA) system, known as the Pier Power Monitoring/ Utility Control System (PPM/UCS), at PWC San Diego. A joint effort between PWC San Diego, NAVFACCO, NFESC, and the U.S. Army COE, Huntsville, Alabama, resulted in a 5-year, IDIQ contract that will allow PWC to better monitor and control their utility systems.

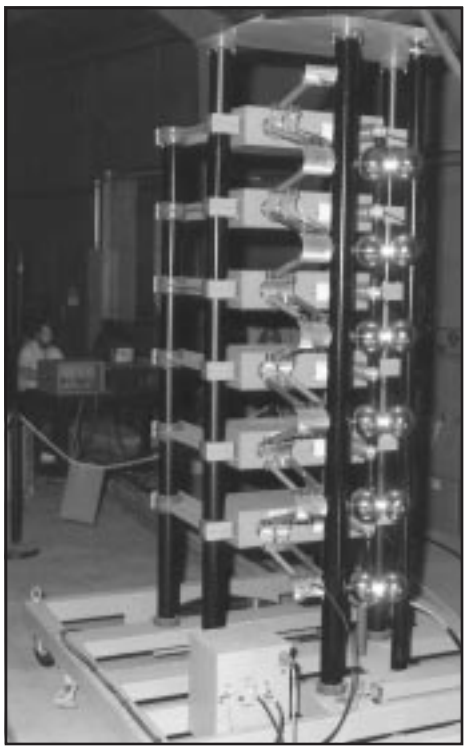
The PPM/UCS will communicate primarily over fiber optics and will initially include seven operator workstations and 86 remote terminal units installed in electrical substations and on piers to monitor utility usage and provide better, more efficient service.

System installation, by PWC San Diego, NFESC technicians, and contractors, will take place over the next two years, and will be closely montiored by Karlin acting as the Contracting Officer's Technical Representative (COTR).

As member of a tri-service team, Karlin plays a key role in updating and improving Energy Monitoring and Control Systems (EMCS) guide specifications and design guidance, testing guidelines, and inspection procedures. He has also conducted training and produced training videos.

Karlin played a major role in development of the Single Building Controller concept, laying the groundwork to the Navy's transition to Direct Digital Control (DDC) of HVAC and other systems.

As part of the EMCS effort, Karlin investigated ways to protect the systems against lightning. One part of the investigation that was especially fun for Karlin involved testing transformers and lightning arrestors. In the photo shown below, he is at the controls of the NFESC 600 kV electrical pulser that simulates the effects of lightning on electrical equipment. This pulser stands about 10 feet tall and is also used to test electrical power transformers, lightning arrestors, and base insulators for VLF antennas. As the pulser discharges, it sounds like a rifle shot, and with the lights out, the sparks are quite impressive!



Karlin at the controls of the High Voltage Pulser

Karlin graduated with a B.E.S. in Electrical Engineering from Brigham Young University and an M.S. in Electrical Engineering from Utah State University. He is a registered professional engineer in the State of Utah.

Karlin came to work for the Navy in 1979, but first served as an Air Force Officer assigned as an electrical engineer for Laughlin AFB, Del Rio, Texas. Next, he spent a year at a remote 440-man radar/ fighter intercept station at King Salmon AFS, Alaska, as the Site Civil Engineer in charge of facilities operation and maintenance. The fishing was great!

From hot and dry, to cold, and then to hot and humid, he ended his military career in Panama City, Florida, at the Air Force Engineering Service Center at Tyndall AFB as a research engineer.

Karlin plays several musical instruments and is now attempting to play classical/ flamenco guitar. He says it is hard to unlearn 30 years of bad habits playing folk guitar to pick up the classical guitar!

To contact Karlin:

(805) 982-1268 or DSN 551-1268

(805) 982-5388 or DSN 551-5388

canfieldkj@nfesc.navy.mil
- or -
NAVFAC Global Listing: Canfield, Karlin

The average U.S. home uses the energy equal to 1,253 gallons of oil every year.

Check us out on the Worldwide Web:

URL *http://www.nfesc.navy.mil*
or
URL *http://energy.navy.mil*

For Technical Assistance, call:

1 - 888 - 4 THE ESC (1-888-484-3372)

ESPC FAQS

We've got several projects that have simple payback periods of 8 to 11 years. Can an ESPC contractor take on these kinds of projects?

A rule of thumb in ESPC is that the actual delivery order term for projects is about twice the simple payback period. So, if the overall simple payback for a bundle of projects is ten years, you can figure that the delivery order term will be in the neighborhood of twenty years when financed through an ESPC. As contracts are operational for a maximum period of 25 years, this means that such long term projects must be identified and tasked fairly early in the contract term. Other than that, there is no problem in putting together delivery orders for relatively long term payment periods. Check with your claimant's Energy Office to see what their policy is on delivery order term length.

Do we need to have an overall facility energy audit before we enter into an ESPC contract ?

Not necessary. Audit data may be helpful in setting up an original sample task for proposal evaluation purposes, but it's not essential. Once an Energy Service Company (ESCO) is working on your base, they will be developing energy conservation measure proposals using engineering data developed by their own personnel. However, a good energy audit will provide you with data you can use in negotiating with your ESCO and in working with them to develop new delivery orders.

Is it necessary to go through a competitive process every time we want to implement an ESPC delivery order?

Not at all. In cases of site-specific, regional, and Super ESPC contracts, delivery orders can be negotiated with your ESCO on a sole source basis after initial delivery order award. Under the Army Corps of Engineers contracts, even the first delivery order is negotiated with the selected ESCO. One of the basic concepts of ESPC is the development of partnerships between DON facilities and ESCOs, allowing a continuing dialogue leading to implementation of delivery orders to meet the energy conservation strategy of each facility.

Can our facility go directly to DOE to obtain a delivery order award under Super ESPC?

No, and why would you want to? When you call the DON ESPC Team, you enlist the aid of technical, financial, and contracting experts who have the experience and knowledge necessary to expedite the process and make things work right the first time. And, since they are centrally funded, their services are free of cost to your facility through award of the first delivery order. Besides, if you go directly to DOE, they will tell you to call the DON ESPC Team. You *can* go directly to the Army Corps of Engineers to make use of their contracts, but, again, why would you want to? The ESPC Team knows where the pitfalls in this kind of contracting lie and will help you avoid them.

We have some projects that show fairly good energy savings, but have really good operation and maintenance savings. Can O&M savings be used to pay off ESPC delivery orders?

Absolutely. But, caution must be exercised in the evaluation of the applicability of savings from O&M functions as part of the payments stream. First, the savings have to be real; that is, they have to be reflected in actual avoidance of costs which would be budgeted and funded. An example would be an observable reduction in use of a base operating services contract currently in place. Second, the savings have to be capturable for use in making payments to the contractor. Your comptroller will have to investigate to ensure that there is a way to obtain and transfer the unspent funds to the account from which your ESCO is paid. Current NAVFAC policy is that claimable O&M savings cannot exceed 50% of the total guaranteed savings under a delivery order.

What's New?

The entire ESPC concept got a terrific boost in late July when the President emphasized its use during a radio address and further stressed the subject in a memorandum to the heads of all Executive Departments and agencies. The memo directs all Federal agencies to maximize ESPC use and to propose ways to expand ESPC authority. All agencies are required to develop and submit plans for using ESPC in their energy conservation efforts. Look for the President's Memorandum on our new web page.

The ESPC Team invites everyone to visit our new web page that has been up and running since early August. **The URL is http://energy.navy.mil/espc/espc(1).html**. You'll find information on the types of contract vehicles available, the process by which ESPCs are implemented, our latest brochure, and other information relating to ESPC. Your comments and suggestions for how to make it more helpful and informative are appreciated.

The current focus of the ESPC Team is a program to increase awareness of NAVFAC's Engineering Field Divisions (EFDs) with ESPC to prepare them for increased participation and implementation of performance contracts. LANTDIV personnel in Norfolk and SOUTHDIV personnel in Charleston recently participated in presentations that provided detailed information on how ESPCs work in addition to implementation and administration techniques. As more of these contracts are awarded, the EFDs will be called upon to provide expertise to support facilities under their cognizance. The Team has also taken steps toward the establishment of a formal Contracting Officer's Representative (COR) course specifically oriented to ESPC, under the direction of the Civil Engineer Corps Officers School (CECOS). We'll keep you informed of progress on this training course.

ESPC Update

We mentioned in the last issue that funds were being allocated for "buydown" of ESPC and DSM projects. We are pleased to report that the first of this funding was disbursed to NSWC Crane, NAS Key West, and NAVSTA Roosevelt Roads. These three activities shared a total of over $300,000 that was applied to three delivery orders; one at each facility. These funds are applied to reduce financing costs to the Navy and are generally less than 10% of the project cost. As new delivery orders are awarded, they will continue to share in these funds. Check this column in the next issue of *Energy News* for information regarding continuation of this outstanding program in FY99!

In our *ESPC FAQS* column found in the last issue, we mentioned that DOE was offering no cost workshops for use of their Regional Super ESPC Contracts. Shortly after we went to press, we found that DOE had changed this policy and was charging a fee for the workshops. The ESPC Team made 11 Navy representatives very happy by subsidizing their attendance at the Southeastern Region Workshop. There were more Naval attendees at the workshop than from any other Federal agency. DOE has recently awarded contracts for their Central and Midwestern Regions. Watch this column for information on upcoming workshops if your facility is in one of these regions. Don't forget to check our companion column, *ESPC FAQS*, on page 4.

Got questions? Send them to:

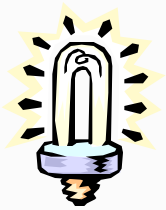
Don Yokum
(805) 982-3560 or DSN 551-3560
Internet: yokumdg@nfesc.navy.mil

Dave Schuelke
(805) 982-3501 or DSN 551-3501
Internet: schuelkejd@nfesc.navy.mil

Boosting the fuel efficiency of cars in the United States by a mere 1.5 miles-per-gallon would save more oil than is estimated to lie under the Arctic National Wildlife Refuge.

Lose that extra weight! Remove unnecessary heavy items from your car.

Every extra 100 pounds costs you about half-a-mile-per-gallon.



BURNED OUT ?

T5 and LED Lighting - New Technologies on the Market

Now that you've completed your lighting retrofits, is it time to re-lamp already? Two types of lamps are bringing re-lamping into question again, T5 fluorescent and multi-diode LED lamps. They can help reduce energy consumption, but as discussed below, there's no need to run out and buy them yet.

T5 Lighting

T5 lamps have many similarities to T8 lamps, but there are noticeable differences. T5 lamps are sleeker and have a slightly higher lumen output per watt than comparable T8 lamps. The "5" in the name, T5, refers to the diameter, 5/8 of an inch. The lamps require specially designed high-frequency electronic ballasts with high initial starting voltage. T5 lamps are used mostly for retail lighting, decorative applications, and tightfitting spaces. The rated lifetime is about the same as that for T8 lamps.

Compared with T8 lamps, T5 lamps are brighter per unit area. The brightness from such a thin tube can cause glare. Lighting designers use indirect lighting techniques to overcome this problem. Dimming is a feature that is being promoted for T5 ballasts, but as yet, it is not available. Ballasts are available in either one or two lamp configurations while conventional T8 lighting designs often use 3 and 4 lamps.

Since T5 lamps are for specialty applications, energy conservation and payback are not the usual considerations. Our calculations indicate that T5 lamps are still cost prohibitive and not until prices decrease by four-fold, will T5s be competitive.

The Navy has T5 lighting applications comparable to the commercial sector. T5 lamps are used where space constraints dictate or in display lighting which requires their unique brightness to enhance appearance. Unfortunately, T5 lighting is too costly for general office use and is not recommended for T8 retrofits.

LED Lighting

Multi-diode "light emitting diode" (LED) lamps are comparable to low wattage incandescent lamps and are similar in shape to a conventional incandescent lamp with a screw base. The lamps, composed of 50 to 150 LEDs, are rated for more than 100,000 hours of operation. Until recently, high output LEDs were available only in colors of red, yellow, blue, and green. Only the red lamps were reliable. Prototype white lamps eventually emitted bluish light. LED lamps are presently used primarily for equipment lighting, traffic lights, and road signs.

LED lamps are relatively dim compared to conventional incandescent lamps. However, a low power consumption of 3 to 7 watts, in addtition to durability, increases their appeal. The diodes can withstand severe weather and other harsh conditions, such as a direct impact. Although considerable energy savings can be realized, it is usually not enough to offset their high cost. For typical applications, our calculations indicate that most of the savings are attributed to reduced maintenance.

LED lamps can be used by the Navy in the same manner as commercial applications. Although they can directly replace incandescent, white LED lamps lack luminous intensity and proper color rendering to be used for office lighting or other general reading areas. LED lamps are usable in traffic lights, in areas requiring durable decorative lamps, and where existing incandescent lamps are costly and difficult to maintain.

Although T5 and LED lamps are not ready for wide use by the Navy for general office lighting or energy conservation, eventual performance improvements and price cuts may cause these technologies to become attractive to the Navy. See the table for lamp comparisons. For questions regarding lighting or other engineering services, contact ***Mr. Eugene Crank, Energy Program Execution Branch, ESC222, at (805) 982-5589 or DSN 551-5589. E-mail: crankev@nfesc.navy.mil.***

Table 1. Lighting comparisons.

Lamp	Light Output (Lumens)	Power Rating (Watts)	Typical Price	Pros	Cons
T5 fluorescent (45.750")	2750	28	$12.00	Bright light Compact	Expensive
T8 fluorescent	2850	32	$ 3.00	Energy efficient Inexpensive	Higher mercury (48") content
Multi-diode LED (White)	125	4	$30.00	Extremely long life (100,00+hrs) Durable	Expensive
Incandescent (White)	235	25	$ 0.50	Inexpensive	Short life Fragile

It's Not Magic - It's PdM!

Predicting Equipment Failures Through Vibration Analysis

Rotating Equipment

The NFESC predictive maintenance (PdM) vibration analysis program for rotating equipment has proven to be very successful in the reduction of maintenance costs and the extension of equipment life in several facilities around the world. Using PdM techniques, maintenance personnel have diagnosed and corrected equipment problems before catastrophic failures occurred. Additionally, several facilities have optimized their service schedules based on hours of operation and actual conditions.

Some of the success has been due to the online monitoring of remote sites. NFESC has installed remote sensing devices on equipment in several remote sites. These sensors allow temperature and vibration data to be transmitted back to a central location and monitored. This technology is relatively inexpensive and can save big bucks!

Reciprocating Equipment

Reciprocating equipment, such as engines and compressors, require a great deal of maintenance. Usually minor repairs are performed in-house and major repairs are contracted out. Using PdM techniques, many faults are detected and corrected before major repairs are necessary; thus lowering maintenance costs. For example, when reciprocating equipment is used for critical service, such as backup generators, they are run periodically for load tests. The problem with this method is that it may only reveal the equipment's performance at the time of the load test. Minor problems that exist, but do not yet affect the performance of the machine, are not detected. When the backup is put into service, these small problems can become pronounced, leading to complete machine failure.

NFESC engineers can assist you in tailoring a predictive maintenance program to a particular plant. Activities that have utilized this service report reduced maintenance costs in relatively short time periods following the initial investment.

This technology has become common practice in many industrial complexes. PdM cuts operating costs while increasing machine reliability and life span. Rebuilding entire machines due to one or two isolated problems that give the appearance of worn out equipment is no longer necessary.

Using PdM, once the problems are discovered, they can be scheduled for repair at the next planned downtime. Equipment maintained in this fashion can be run to the full extent of the life span with a minimum number of rebuilds.

For additional information on PdM, contact

Mr. Galen Marks
Mechanical Systems Branch, ESC231
(805) 982-3541 or DSN 551-3541
E-mail: marksgl@nfesc.navy.mil.

Millions of Gallons Saved!

180,000,000 gallons of water equating to $600,000 a year, were identified as Water Conservation Opportunities in a recent water survey of the Naval Aviation Depot in Cherry Point, North Carolina. The survey, conducted by NFESC, resulted in two large projects and several low-cost / no-cost opportunities, which were developed into DD 1391 project packages and submitted for central energy funding.

The first of these projects, replacement of a once-through cooling system, saving 106 million gallons of water a year, has already received funding. A new closed-loop system will be under construction in the near future. The second, an upgrade to aircraft washing facility equipment, has a Savings-to-Investment Ratio of 20.7. At the top of the FY00 funding plan, it will save over 33 million gallons and $115,000 a year.

Water surveys can assist activities in more ways than simply identifying projects. Previous surveys have unearthed infiltration into sewage lines, highlighted improper billing procedures by local municipalities, and helped to resolve internal billing questions.

The survey highlighted in this article resulted in a 56% reduction in overall water consumption; others have resulted in 20% and 30% reductions in water usage – ***how much could your base save?***

Water is the forgotten utility cost because it is usually rather small in comparison to others. However, when considering water costs, you should look at both your water and sewage disposal bills. ***How would you like to reduce those bills by 20%?*** To discuss water conservation issues or a water survey, contact:

Dan Magro
(805) 982-3529
or DSN 551-3529
Email:
magrodt@nfesc.navy.mil

(Winners Announced - Continued from page 1)

Winners in the Organization Category for Energy Efficiency and Management:

Portsmouth Naval Shipyard, Maine, reduced energy consumption by 26 percent compared to 1985, cutting energy use by 332,628 MBtu and energy costs by more than $2 million. Boiler plant modifications made in FY97 are producing estimated annual savings of $1 million in averted operations and maintenance costs. Numerous renovation projects were completed to upgrade several heating, lighting, air conditioning, and water heating systems.

Naval Construction Battalion Center (NCBC) Port Hueneme, California, reduced energy consumption per square-foot by 23 percent compared to 1985, in spite of assuming many new energy-intensive facilities. In FY97, NCBC Port Hueneme completed renovation of 400 housing units with energy efficiency improvements, purchased 34 electric vehicles and three multi-vehicle charging stations, and renovated their Energy Demonstration Center.

Norfolk Naval Shipyard, Virginia, reduced the shipyard's utility budget from $18.1 million in FY96 to $14.2 million in FY97. Energy consumption has dropped 29 percent per square-foot since 1985. Norfolk pursued aggressive metering and survey programs by installing steam and electric meter LANs and conducting detailed electrical, steam, and air conditioning surveys.

Naval Submarine Base New London, Groton, Connecticut, reduced energy consumption per square-foot by 20.2 percent compared to 1985. New London converted its boilers to natural gas, and installed a 5-MW co-generation turbine power plant, as well as a natural gas-fired absorption chiller and a 200-kW phosphoric acid fuel cell. New London also replaced motor generator sets, installed high efficiency lighting systems, and direct digital controls for HVAC systems.

Naval Air Station, Oceana, Virginia, reduced energy consumption by 28.4 percent per square foot compared to its 1985 baseline. During FY97, NAS Oceana completed an Energy Vision study to help chart a high-energy efficiency path well into the future. As part of the Energy Vision, Oceana is creating a compact and efficient steam distribution system by converting buildings located at the ends of long steam lines to natural gas heating systems and geothermal heat pumps.

Winner in the Organization Category for Alternative Financing:

Naval Surface Warfare Center, Crane, Indiana, signed a $15 million Energy Savings Performance Contract agreement in FY97 which could reduce the command's overall energy consumption by about 25 percent at a savings of 200 billion MBtu /year. The first delivery order, valued at $2 million, involves 46 buildings covering 400,000 square feet."

The fleet, through technological advances and improved operational procedures, is avoiding an estimated $75 million annually in fuel costs.

ENERGY NEWS

Published By
NFESC

An unofficial publication of the
Energy and Utilities Department
Commanding Officer:
CAPT Donald G. Morris
CEC, USN
Energy and Utilities Department Head:
Richard Messock
Layout and Design:
Tara Elkinton, Publications Division, ESC73
(805) 982-1069 or FAX: (805) 982-1594
The views and opinions expressed in this publication are not necessarily those of the United States Navy.

ADDRESS CORRECTION

Has your address changed? Please fill out the information below and fax this page to (805) 982-5388.

Name _____
Title _____
Organization _____
Street _____
City _____ **State** ___ **Zip** _____
E-mail _____

Printed on recycled paper